

CLAIM AMENDMENTS

Please amend the claims by cancelling withdrawn claims 47-54, amending claims 28, 29 and 45, and adding new claims 55-69, all without prejudice, as indicated on the following listing of all the claims in the present application after this Amendment:

1-20. (Cancelled)

21. (Previously presented) A process condition monitoring device comprising:
a substrate having a first perimeter, the substrate comprising sensors to measure the processing conditions of the substrate at different areas of the substrate;
an electronics module having a second perimeter that encloses the same or less area than the first perimeter, the module comprising:
 signal acquisition circuitry coupled to an output of the sensors;
 data transmission circuitry coupled to the signal acquisition circuitry;
 a power source; and
leads connecting the substrate to the electronics module for transmitting signals between the substrate and the electronics module, the leads providing a flexible connection that allows relative movement between the substrate and the electronics module; and
a remote data processing system, and wherein the data transmission circuitry comprises a wireless transceiver to transmit the processing conditions to the remote system.

22. (Original) The monitoring device of claim 21 wherein the signal acquisition circuitry is configured to amplify an output signal of the sensors.

23. (Previously presented) The monitoring device of claim 21 wherein the electronics module comprises a micro-controller and is configured to process the output signal using sensor calibration coefficients.

24. (Original) The monitoring device of claim 22 wherein the signal acquisition circuitry is further configured to provide an input signal to the sensors.

25. (Original) The monitoring device of claim 24 wherein the input signal comprises input power.

26. (Cancelled)

27. (Original) The monitoring device of claim 22 wherein the data transmission circuitry comprises an analog to digital converter.

28. (Currently amended) The monitoring device of claim 21 wherein the data transmission circuitry comprises a memory, and wherein the data transmission circuitry stores the processing conditions in the memory.

29. (Currently amended) The monitoring device of claim 21 wherein the remote system is configured to process the ~~output signal~~ received processing conditions using calibration coefficients to provide a final output value.

30. (Original) The monitoring device of claim 21 wherein the transceiver transmits and receives RF signals.

31. (Original) The monitoring device of claim 21 wherein the transceiver transmits and receives IR signals.

32. (Original) The monitoring device of claim 21 wherein the transceiver transmits and receives sonic signals.

33. (Previously presented) The monitoring device of claim 21 wherein the data transmission circuitry comprises one or more connectors to couple the remote data processing system to the device with a communications cable.

34. (Previously presented) The monitoring device of claim 21 wherein the remote system is a microprocessor controlled device.

35. (Original) The monitoring device of claim 21 wherein the processing conditions measured by the sensors comprise one or more of the following conditions: temperature, pressure, flow rate, vibration, ion current density, ion current energy, and light energy density.

36. (Previously presented) The monitoring device of claim 21 wherein the leads form a ribbon cable.

37-44. (Cancelled)

45. (Currently amended) ~~The~~ A process condition monitoring device, of claim 21 comprising:

a substrate having a first perimeter, the substrate comprising sensors to measure the processing conditions of the substrate at different areas of the substrate;

an electronics module having a second perimeter that encloses the same or less area than the first perimeter, the module comprising:

signal acquisition circuitry coupled to an output of the sensors;

data transmission circuitry coupled to the signal acquisition circuitry;

a power source; and

leads connecting the substrate to the electronics module for transmitting signals between the substrate and the electronics module, the leads providing a flexible connection that allows relative movement between the substrate and the electronics module;

a remote data processing system, and wherein the data transmission circuitry comprises a wireless transceiver to transmit the processing conditions to the remote system; and

wherein in a first position the electronics module is above or below the substrate, and in a second position the electronics module and the substrate are displaced from each other such that the first and second perimeters do not intersect.

46. (Previously presented) The process condition monitoring device of claim 45 wherein, in the first position both the electronics module and the substrate are held by one or more robot hands and in the second position the substrate is within a chamber and the electronics module is outside the chamber.

47 – 54. (Cancelled)

55. (New) A monitoring system, comprising:

a substrate having a first perimeter, the substrate comprising sensors that measure the conditions of the substrate at different areas of the substrate;

an electronics module having a second perimeter that encloses the same or less area than the first perimeter, the module comprising electronic circuitry that receives data outputs of the sensors and transmits data of the measured conditions out of the module; and

leads connecting outputs of the sensors on the substrate with the electronics module electronic circuitry, the leads providing a flexible connection that allows relative positioning of the substrate and the electronics module between at least a first position wherein the electronics module is located above or below the substrate and a second position wherein the electronics module and the substrate are displaced from each other such that their first and second perimeters do not overlap.

56. (New) The monitoring system of claim 55, wherein, in the second position, the substrate is located within a processing chamber and the electronics module is located outside the chamber.

57. (New) The monitoring system of claim 55, wherein the substrate and electronics module are held by different hands of a robot.

58. (New) The monitoring system of claim 55, wherein the leads are in the form of a flat ribbon cable.

59. (New) The monitoring system of claim 55, wherein the electronic circuitry of the module includes a wireless device that transmits the data of the measured conditions out of the module.

60. (New) The monitoring system of claim 59, wherein the wireless device includes a transceiver.

61. (New) The monitoring system of claim 60, wherein the electronic circuitry of the module additionally processes signals received by the wireless transceiver to control operation of the electronics module.

62. (New) The monitoring system of claim 59, wherein the wireless device transmits the data of the measured conditions out of the module by any of a group of signal types including infrared, acoustic, sonic, ultrasonic, radio frequency and inductive signals.

63. (New) The monitoring system of claim 60, wherein the transceiver operates to transmit and receive any of a group of signal types including infrared, acoustic, sonic, ultrasonic, radio frequency and inductive signals.

64. (New) The monitoring system of claim 55, wherein the electronic circuitry of the module is connected a wired circuit that transmits the data of the measured conditions out of the module.

65. (New) The monitoring system of claim 55, additionally comprising a remote data processing system to which the circuitry of the electronics module transmits data of the measured conditions.

66. (New) The monitoring system of claim 59, additionally comprising a remote data processing system having a wireless device that receives the data of the measured conditions sent by the wireless transmitter of the electronics module.

67. (New) The monitoring system of claim 61, additionally comprising a remote data processing system having a wireless transceiver that receives the data of the measured conditions sent by the transceiver of the electronics module and sends the signals to control operation of the electronics module.

68. (New) The monitoring system of claim 55 wherein the sensors are characterized by measuring a processing condition selected from a group including temperature, pressure, flow rate, vibration, ion current density, ion current energy and light energy density.

69. (New) The monitoring system of claim 61 wherein the sensors are characterized by measuring a processing condition selected from a group including temperature, pressure, flow rate, vibration, ion current density, ion current energy and light energy density.